

EFN Report on the Implementation of Directive 2010/32/EU on the prevention of sharps injuries in the healthcare sector



Descriptive and Explorative Cluster Analysis of Directive 2010/32/EU Implementation into Clinical Practice Data

Biosafety Summit December 2013

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ACKNOWLEDGMENTS

Although there is generally an acknowledgement of ‘questionnaire overload’ and ‘saturation’, it becomes very clear that when it comes to safety, healthcare professionals, especially nurses, are committed to engage. Nurses want to have a say as they know EFN can move and keep safety and quality high on the EU political agenda.

Our gratitude goes therefore the thousands of respondents who took their time to complete the online questionnaire! Thank you!

This report provides the results of an online questionnaire elaborated by the EFN on the implementation of Directive 2010/32/EU on the prevention of Sharp Injuries in the hospital and healthcare sector. The EFN, through its membership, have contacted the frontline workforce to evaluate the state of art of transposition and implementation into practice at the workplace. The results are presented on the 2nd December 2013 at the European Biosafety Summit in the Polish Parliament in Warsaw.

This report builds further on existing reporting’s on the topic, particularly the Final Report on Promotion and Support of Implementation of Directive 2010/32/EU on the prevention of sharps injuries by EPSU & HOSPEEM and the Report conducted by Swedish Municipal Workers’ Union, Vision and the Swedish Association of Health Professionals named “A zero-tolerance vision for blood-borne infection caused by sharps in healthcare”.

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Executive Summary

The EFN elaborated an online questionnaire targeting the frontline workforce to evaluate the state of implementation of the Directive 2010/32/EU into the daily practice of health professionals and workers. The results of that analysis were presented on the 2nd December 2013 at the European Biosafety Summit in the Polish Parliament in Warsaw.

Overall, professionals feel that countries have put in place measures for the prevention of sharps injuries and that their practice has improved thanks to the design and implementation of the Directive. The data analysis of almost 7000 respondents has been proven the Directive 2010/32/EU has a positive impact in the daily practice and clinical environment of the health professionals, with safe mechanism at their disposal, available basic information at the workplace next to feeling a clear responsibility in reporting.

However, respondents identify areas being less covered, in particular the ones concerning specific education on sharp injuries prevention, the performance of risk assessments at the workplace, the explicit ban of recapping and surprisingly the lack of awareness campaigns. Furthermore, respondents stress the importance of more actions needed to guide professionals what to do when they actually suffer from a sharps injury. Guidelines need to be better rooted into daily practices. It is very important that nurses are engaged in risk assessment and that it becomes not just a theoretical exercise managed by managers or directors. Nurses working in the field must be involved in these assessments and the role of the Unions is very important in ensuring this.

The role of Link Nurse, very successful in the area of infection control, can be further developed through EU social cohesion funds to help implement the main articles of the Directive 2010/32/EU. Strengthen the prevention of sharp injuries at health care settings and better coordinate those areas that are currently missing, in support to the nurses, mainly the follow-up and the education and awareness issues are identified by the respondents as crucially important to make progress in the EU safety and quality agenda. As regards education, a well-trained health workforce is essential to prevent the risk of injuries and infections from sharps, as stated in Directive 2010/32/EU. In order to overcome this lack of training, Member States should strengthen the Continuous Professional Education and make use of the available European Social Funds during the period 2014-2020 with the objective of

strengthening knowledge transfer and implementation (Horizon 2020).

Tenders for the supply of safety engineered devices should include specific user training responsibility on the supplier. Furthermore, nurses should be more involved in the selection of suitable, safety engineered devices, as the performance and quality of these does vary.

The data gathered showed a positive implementation of Directive 2010/32/EU into the clinical practice. A majority of respondents from the 28 countries represented in this analysis, have measures in place to prevent sharps injuries. The data show that implementation of EU legislation on sharp injuries is well on track; however more need to be done to reach “zero tolerance” in the field of sharp injuries!

Background

Needlestick or sharps injuries occur when a needle or other sharp instrument accidentally penetrates the skin. This is called a percutaneous injury. If the needle or sharp instrument is contaminated with blood or other body fluid, there is the potential for transmission of dangerous infections, and when this occurs in a work context, the term occupational exposure, to blood, body fluid or blood-borne infection, is used.

Infection has become an increasingly significant problem within the healthcare sector. Different tasks are associated with different risks. There is a risk of infection in all healthcare work when personnel come into close contact with other people. The risk of infection increases during work in which infectious agents or infected material is handled, when handling sharp instruments, and in certain cases during cleaning. Personnel providing care to or taking care of people are often subject to sharps injuries. People can carry an infection without displaying any symptoms. For this reason, every sharps injury must be regarded as a serious risk when caused by sharp objects that have been in contact with bodily fluids or other potentially infectious materials. Sharps injuries within healthcare and nursing care put personnel at risk, and there are various reasons why such injuries occur. Causes include workloads that are too high, anxious patients, anxious relatives, or other events that create stress, but it is mainly due to an unappropriated use of preventive measures. The consequences of a sharps injury can be severe, but most sharps injuries are referred to as zero injuries; i.e. injuries not resulting in sick leave. Sharp injuries are a cause of significant distress as an injured worker can face many months of uncertainty. This can be a huge alarming event when no infection occurs. This can be a major disincentive to a career in nursing. A significant issue as the EU faces increasing shortages of qualified nurses.

On 10 May 2010, Directive 2010/32/EU was approved by the EU Institutions to prevent injuries and blood-borne infections to healthcare professionals and workers. The EU Sharps Directive establishes a framework that includes measures to address risk assessment, risk prevention, training and information, awareness raising and monitoring and response and follow-up procedures in relation to sharps injuries. The agreement specifies general principles to avoid injuries and is the basis for Council Directive 2010/32/EU implementing the Framework Agreement on prevention of sharps injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU.

Last May 11, 2013, was the deadline for the transposition of the Directive into the national legislation of each Member State. Some months after is a suitable time to evaluate whether preventable measures have been taken in the daily practice of health professionals.

The objective of the prevention of sharp injuries is also, through the dissemination of information, to ensure that each employee's safety awareness is increased, while also ensuring that requirements are imposed instructing the procurement of safety- engineered devices. As well as to create a zero-tolerance vision for blood-borne infection caused by sharps in healthcare. The risk of needlestick injuries in the workplace can be significantly reduced by using safety- engineered devices.

Methodology

Survey Objectives and Questionnaire Design

The questionnaire aimed to gather knowledge and a better understanding on how the Directive 2010/32/EU impacts the daily work of nurses and other health professionals, from a professionals' perspective. The design of the questionnaire used as reference the articles set in Directive 2010/32/EU and as such cover the following areas: risk assessment, elimination, prevention and protection; information and awareness-raising; education and training; reporting, responses and follow up. The questions were formulated with the aim of understanding whether specific preventable measures are taken up to prevent injury and/or transmission of infection in the provision of hospital and healthcare services and activities including the use of the safest equipment needed and to provide a clear view on the state of play in the EU (+ EEA) with respect to implementation of the Sharps Directive.

The questionnaire comprised 25 questions and was available in 20 languages: Bulgarian, Croatian, Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Icelandic, Italian, Lithuanian, Polish, Portuguese, Romanian, Slovak, Slovenian and Spanish.

The questionnaires consisted of 4 different parts: the first part aiming to gather general information about the respondents (demographics); the second part being oriented to explore the implementation of the Directive at the workplace; a third part focusing on available equipment; and the final section aiming at gathering information about incidents and reporting.

The final questionnaire was piloted among EFN members and stakeholders engaged in the biosafety summit to double check if the formulated questions were understandable and friendly-formulated, reasonable in timing for completion and whether the questions and measurement scale collected what needed to be measured. We wanted to make sure the data collected were robust to draw conclusions from by increasing the measurement scale reliability and validity.

The 20 questionnaires were hosted on the online platform "Survey Monkey".

Dissemination Online Questionnaire

The target groups were health professionals working in clinical practice, mainly in hospitals, community care centers and elderly care homes.

The dissemination of the questionnaire was taken forward by all EFN members who informed thoughtfully their membership reaching the frontline workforce above all. Other partners on the Biosafety summit encouraged their network to engage with the collection of data as the link to the questionnaire was placed on EFN website, OSHA website, IPASVI website and on the European Biosafety Network website.

Follow-up reminders were sent periodically to the memberships. Targeted and individualised messages were sent specifically to the local contacts in the countries with low response rates, encouraging them to promote the questionnaire via existing local communication channels.

The 20 questionnaires on online platform called “Survey Monkey” were available from the 8th October until the 10th November, 2013.

Ethical Considerations

All participants were given information about the Summit and the questionnaire. Additionally, questionnaires were anonymous. It was assured that the data obtained would be protected and treated as strictly confidential in all reported findings.

Translation is a key concern for each study. The translation of the questionnaires was done thanks to the support of the EFN members. Each translation was double tested but the use of different languages may lead to different interpretations of the same questions across countries which could affect the extrapolation of results.

Statistical Analysis

From Descriptive to Explorative Analysis

Survey Monkey 20 databases (20 questionnaires) were exported to a Statistical Package for the Social Sciences (SPSS) Version 21.0 file and merged into single mother database. After checking inconsistencies in the data, creating frequency tables for each variable and cross tables was the first step to better understand the respondents' views in the different Member States. A first analysis describes the answers from an overall professional perspective, not specifying data per country. This allowed a better understanding of the general mapping of the professionals' perception on the prevention of sharp injuries.

In addition to the descriptive analysis of all variables and a combination of variables, a hierarchical cluster analysis was employed to visualise views and experiences from respondents. The cluster analysis is based on the assignment of a set of observations into different subsets (clusters) aligning data that were similar or different. The cluster methodology is used the identification of variables (dependent, interdependent), clustering procedures (Hierarchical Clustering), dendrogram in Plots and K-means Clustering (number of required clusters). Hierarchical cluster analysis is therefore useful to employ as it begins by separating each case into a cluster by itself. At each stage of the analysis the criterion by which cases are separated is relaxed in order to link the two most similar clusters until all of the objects are joined in a complete classification tree. The basic criterion for clustering is distance in opinion, in views, in experience as expressed in the statements rated on a Likert scale from 'strongly disagree' (1) to 'strongly agree' (4). Views from respondents that are near each other should belong to the same cluster, and views that are far from each other should belong to different clusters. Through cluster analysis patterns can be identified which can lead to a higher level of interpretation, compared to frequency tables and cross tables which are only descriptive measures. It was therefore useful to use a dendrogram to visualise the steps in a hierarchical clustering solution; this shows the clusters being combined and the values of the distance coefficients as each step merges (Figure 3). Connected vertical lines designate joined cases.

Cluster analysis is widely used for multivariate data analysed in a comparative way to better understand the relationships within and between the questionnaire items. This is particularly interesting as the Directive 2010/32/EU composes of specific articles relevant to the clinical

processes and outcomes. The cluster analysis can help analysing the impact of Directive 2010/32/EU on the working environment of nurses and health professionals in general, in relation to the existing knowledge on the subject¹. The cluster analysis was used to divide the general data into sections in order to better understand the relation between the Directive clauses:

- Clause 5 on Risk Assessment (linked to questions 10 and 11).
- Clause 6 on Elimination, prevention and protection (linked to questions 7, 8, 15, 16, 17 and 24).
- Clause 7 on Information and awareness-raising (linked to questions 3, 4 and 9).
- Clause 8 on Education and training (linked to questions 5, 6, and 12).
- Clause 9 and 10 on Reporting, Response and follow up (linked to questions 18, 19, 20, and 21).
- Clause 11 on Implementation (linked to question 25).

This second phase of qualitative analysis, based on clusters, will supplement the understanding of what is going on in daily reality when it comes to prevention of sharp injuries and the interconnections between different factors. This enables to make the raw data more visible for politicians, policy-makers, industry, healthcare professions, managers, patients and citizens.

Sample

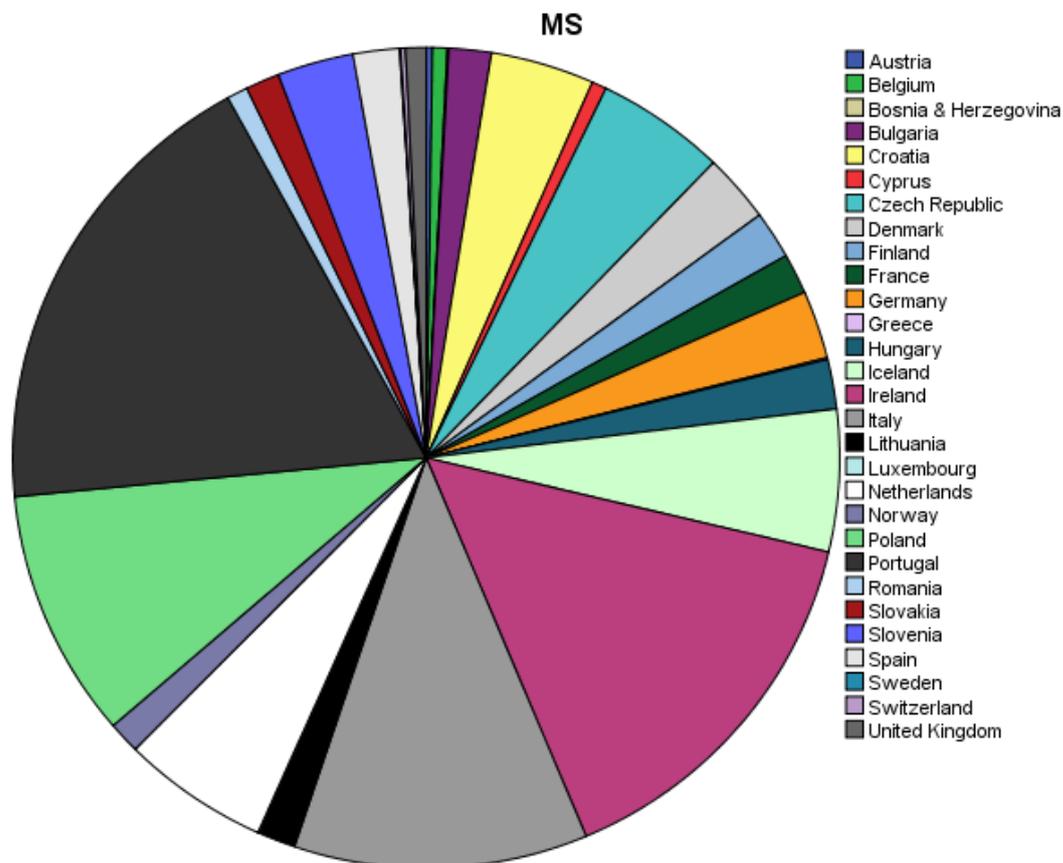
The period decided to keep the survey open enabled to reach out a wide population, covering 31 European countries that are represented by EFN. Primary goal was to collect 4000 responses. The goal was attained and on the closing day there were 6971 responses recorded through the 20 translated questionnaires.

¹ EPSU & Hospeem Final Report. Promotion and Support of Implementation of Directive 2010/32/EU on the prevention of sharps injuries in the hospital and healthcare sector. 30 September 2013.

Results Descriptive Analysis

Distribution of respondents Per Country

The sample size used for the data analysis was 6971 respondents from 27 EU Member States (+ Bosnia & Herzegovina). The highest response came from Portugal (19% representing 1293 respondents), followed by Ireland (15% representing 1045 respondents), Italy (12% representing 801 respondents) and Poland (10%). Respondents from all over the EU expressed their views: Austria (17), Belgium (40), Bosnia & Herzegovina (4), Bulgaria (115), Croatia (283), Cyprus (40), Czech Republic (353), Denmark (188), Finland (131), France (111), Germany (187), Greece (5), Hungary (136), Iceland (390), Lithuania (103), Luxembourg (2), Netherlands (401), Norway (87), Poland (684), Romania (57), Slovakia (92), Slovenia (208), Spain (126), Sweden (3), Switzerland (13) and the United Kingdom (56 respondents). Respondents % rate can be presented in the pie diagram below:



Distribution of Respondents per Professions & Workplace

The majority of the respondents represent nurses (6095 or 95%), followed by healthcare assistants (283 or 4%) and physicians (47 or 1%). In total 546 respondents registered with another occupation.

As regards the workplace, a majority of the respondents (4541 or 77%) are employed in a hospital settings, followed by community care (920 or 16%). Interesting, 8% of the respondents (466) are working in an elderly care home. This will provide a very good understanding on what is going on in daily practice at the hospital and whether appropriate measures have been implemented and used. Importantly, 1044 respondents are employed in other settings than the 3 options listed in the questionnaire. Also here, the analysis is very difficult due to the language barrier.

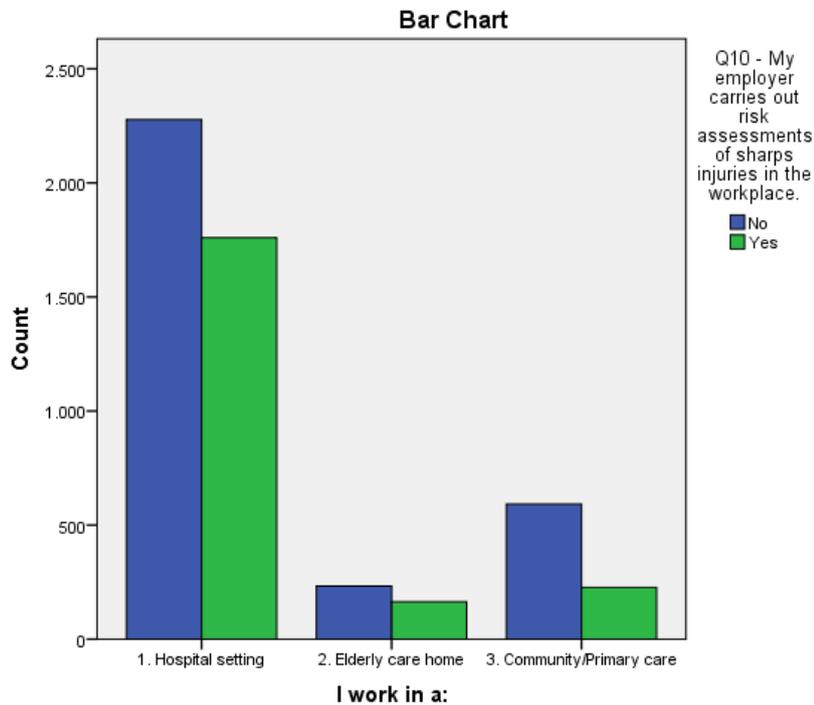
Directive Clause 5 - Risk Assessment

Employers are required to undertake regular risk assessment of all situations where there is injury, blood or other potentially infectious material. Risk assessments shall take into account technology, organisation of work, working conditions, level of qualifications, work related psycho-social factors and the influence of factors related to the working environment. This will identify how exposure could be eliminated and consider possible alternative systems. The results of the risk assessment should be shared with all those affected at the workplace. Where prevention of workers exposure to biological agents is not possible, the risk of exposure must be limited to as low a level as necessary in order to protect the health and safety of the workers concerned. In the light of the results of the risk assessment the number of workers likely to be exposed needs to be kept as low as possible and the design of work processes and use of engineering controls needs to avoid or minimize the release of biological agents into the workplace. Risk assessment should be carried out by trained clinical staff with expertise in occupational health and with input from workers and patients.

Although set out in Clause 5 of the Directive 2010/32/EU, a reality check is needed to evaluate impact and progress. The data indicate that less than half of respondents (2442 or 40%) report that their employer carries out risk assessments of sharp injuries in the workplace (question 10). Being a compulsory requirement of Directive 2010/32/EU, this

indicates more actions have to be promoted to undertake risk assessments in every workplace.

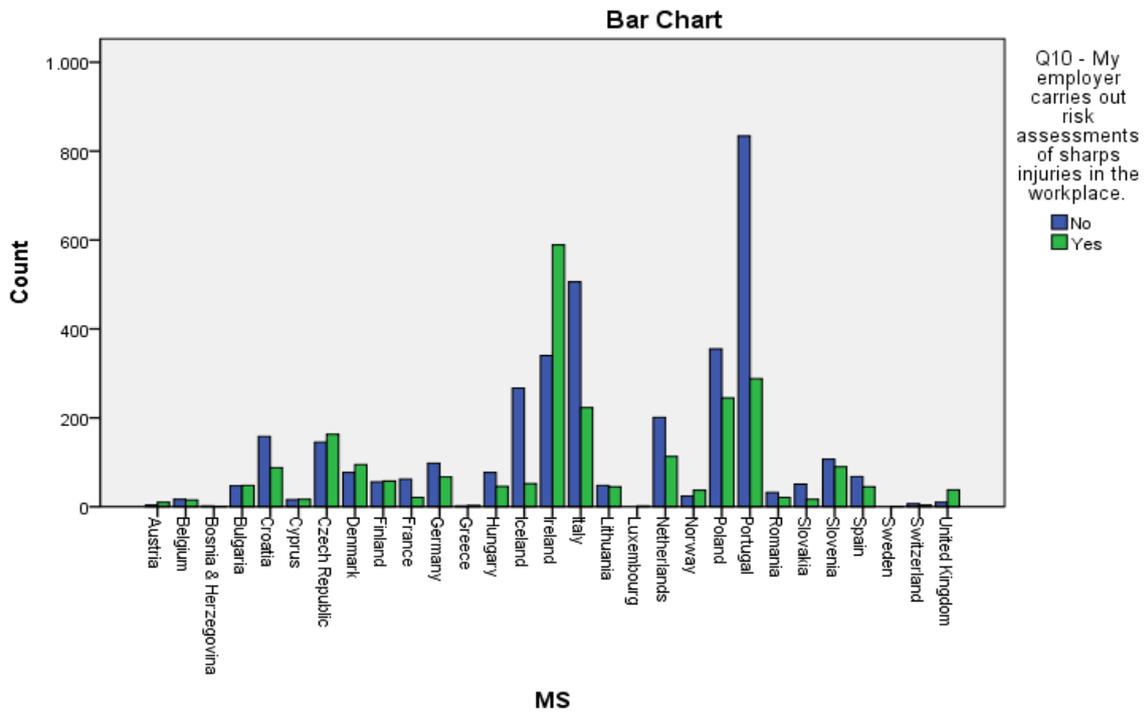
The data further show that this negative finding is not sector specific. All three settings, the hospital, the community care and elderly care settings show the employer is not carrying out risk assessments of sharps injuries, as the graph below visualizes:



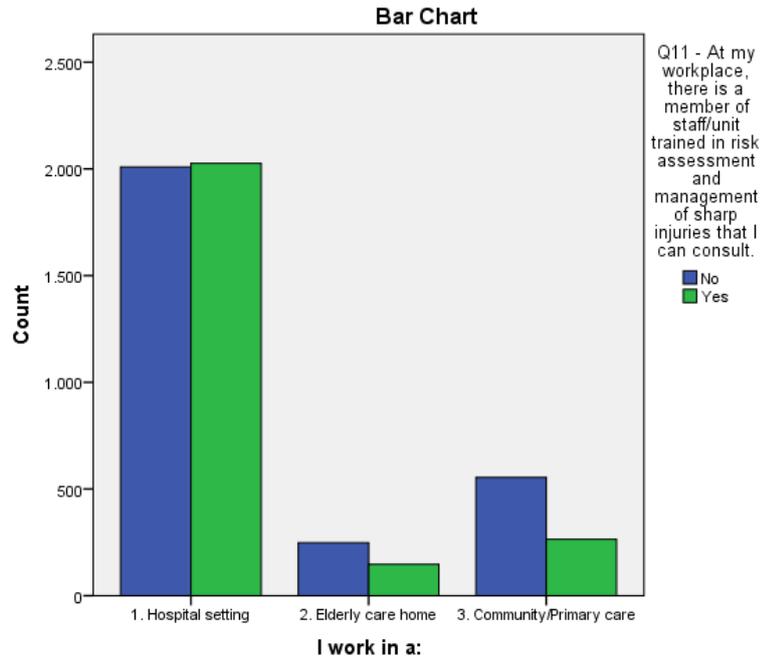
As set out in the Directive, it is equally important that professionals and workers become engaged in risk assessments at the workplace so the Directive article 5 is not just a theoretical exercise done by managers or directors. Professionals and workers operating in the field must be engaged in the mandatory risks assessments and the role of the Unions is very important in ensuring this.

Q.10 My employer carries out risk assessments of sharps injuries			
		Frequency	Valid Percent
Valid	No	3611	59,7
	Yes	2442	40,3
	Total	6053	100,0
Missing	System	918	
Total		6971	

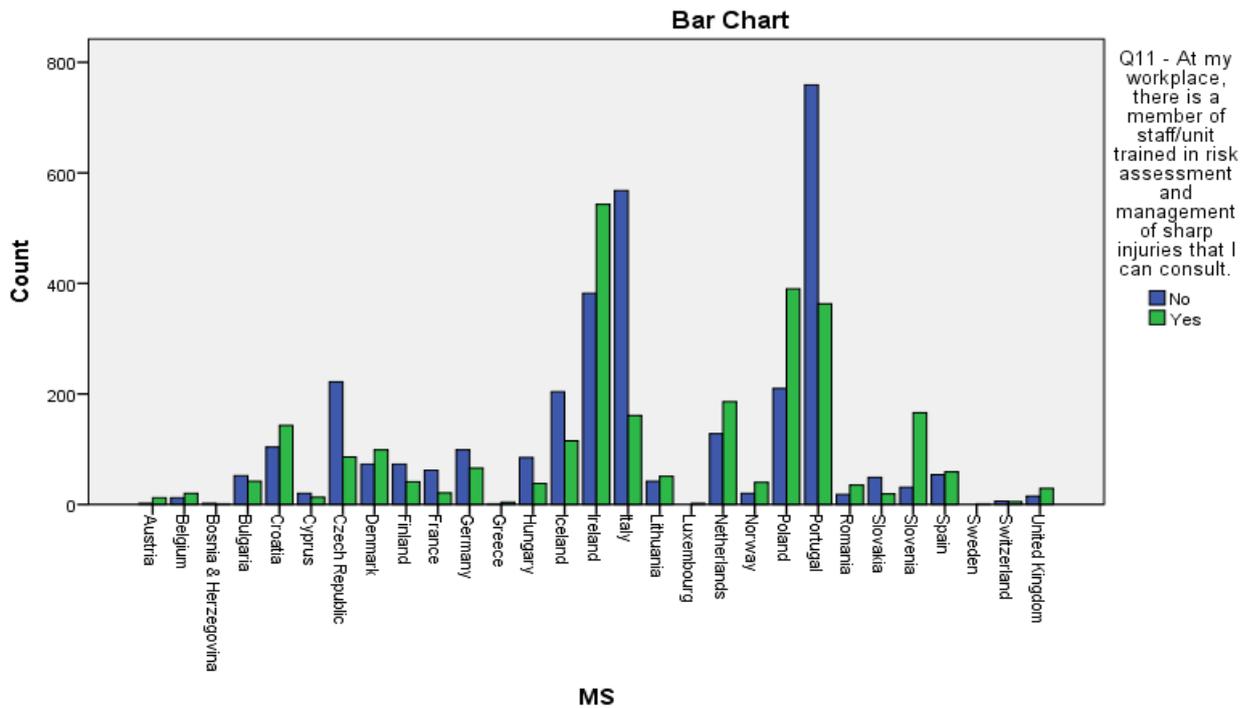
Furthermore, looking at the distribution per country, the countries with more respondents confirming their employer carries out risk assessments are Austria, Czech Republic, Denmark, Ireland, Norway and the UK. On the contrary, the countries where more respondents declare their employers do not carry out risk assessments are France, Germany, Iceland, Italy, Poland, Portugal, Slovenia and Spain.



Interestingly when evaluating the implementation of Article 5 of the Directive, is that more than half of respondents (3293 or 55%) indicate that there is not a reference colleague they can consult on sharp injuries management and prevention at their workplace (Question 11). That implies there might be a lack of reference point where employees can turn to in the units. Although we identified the same trend of lack of risk assessments in the three sectors (hospital, community and elderly care settings), the availability of trained staff in risk assessment is higher in the hospital sector. Only in the hospital settings a larger proportion of respondents confirm there is a member of the staff trained in sharp injuries they can consult. Consequently, it can be argued that more investments, probably with the use of EU funds, need to go to the community and elderly care sector to strengthen risk assessments. The graph below makes these findings clear.



When analyzing the data at country level, those countries were more respondents replied there is a member of staff trained in risk assessment are Austria, Belgium, Croatia, Denmark, Ireland, Netherlands, Poland and Slovenia. Those who more respondents replied negatively are Czech Republic, France, Germany, Iceland, Italy and Portugal.



Not only related to sharp injuries, the occupation of Reference Nurse or Link Nurse is of particular importance in certain areas of healthcare requiring additional knowledge, as is the case for example in infection control. The Link Nurse is a nurse working IN the unit giving special attention to a specific topic, which can be data collection, infection control and even student mentoring. This role has proven to be very successful and effective when engaging colleagues in a process of change. EU Social Funds can be used to build capacity around education on sharp injuries in order to support the development of personnel specifically trained in risk assessments, information and control of sharp injuries events.

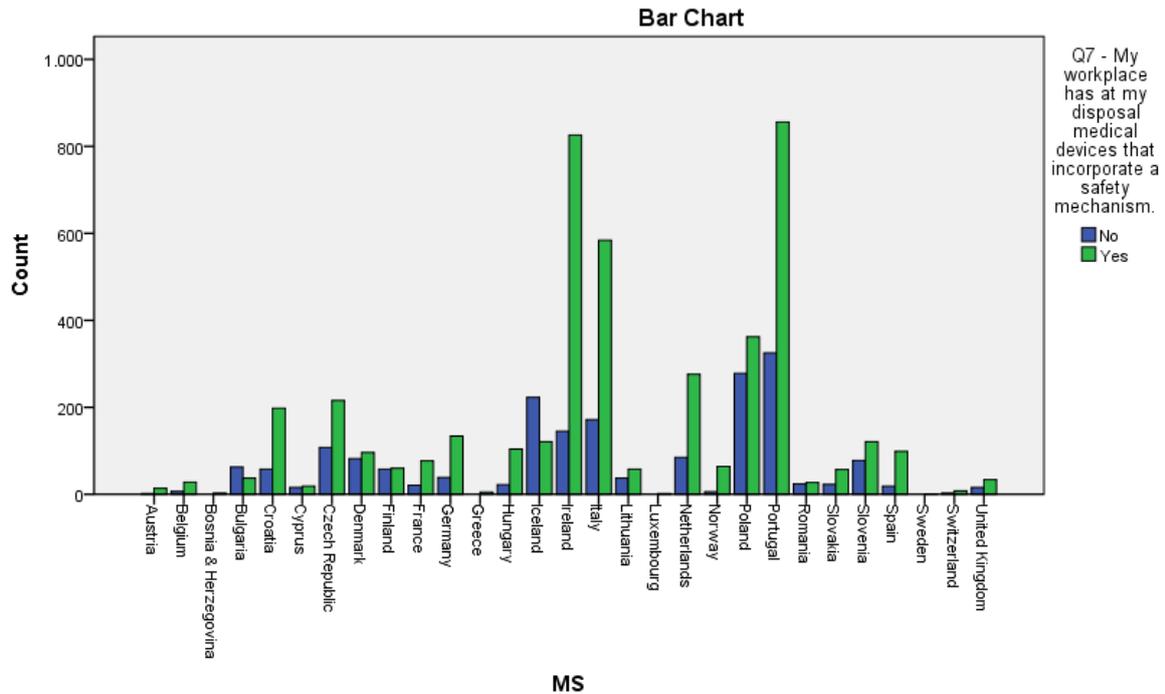
Directive Clause 6 - Elimination, Prevention and Protection

Sharp injuries risks must be eliminated by the consistent introduction of safety devices, sharps bins and safe procedures for using and disposing of sharp medical instruments and contaminated waste. Premises, furnishing and equipment shall be designed so as to avoid the risks associated with biological agents, to limit the spread of biological agents and to facilitate any decontamination required.

In relation to the availability of safety equipment, 70% of respondents (4487) indicate that they have at their disposal medical devices that incorporate safety mechanisms, among those, it is more common that devices and instrumental for blood collection and injection include safe mechanisms. This suggests there is an ongoing process of converting from conventional to safety engineered devices. However, there is also a possibility that some employers may be attempting to ration the provision of safety devices for reasons of cost. A 30% of respondents, have no access whatsoever to safety engineered devices even for the very high risk procedures.

Question 8, indicating the areas where safety devices are provided relate to 44% blood collection (3098 respondents), 31% relates to infusion (2190 respondents) and 39% (2733 respondents) make reference to injections. In addition, 66 respondents indicated other devices that incorporate safe mechanism among which the most frequent are devices for catheterization.

According to countries, the majority of them have got positive results in terms of the existence of medical devices that incorporate safety mechanism. Only Bulgaria and Iceland have a higher percentage of respondents indicating that this is not the case.



Worrying is that 30% of the respondents indicate they have no suitable equipment at their disposal.

Q.7 My workplace has at my disposal medical devices that incorporate a safety mechanism.

		Frequency	Valid Percent
Valid	No	1910	29,9
	Yes	4487	70,1
	Total	6397	100,0
Missing	System	574	
Total		6971	

Firstly, a note of caution, the positive responses do not necessary indicate a universal availability of safety devices, but show that such devices are available for certain applications, blood collection being the most common. These figures are quite worrying. We assume that here needles and contaminated materials can end up in plastic bags or carton boxes, which is unacceptable. We took therefore an interest in analyzing the 30% having not at their disposal medical devices incorporating safety mechanisms. Data show that from the 30% NO answers, 1105 respondents are working in hospitals, 161 are located in elderly care homes and 319 in the community and primary care sector. It should therefore be noted that although values are generally high (70%), continued efforts are required in order to increase the proportion of those who use safety- engineered devices to 100%.

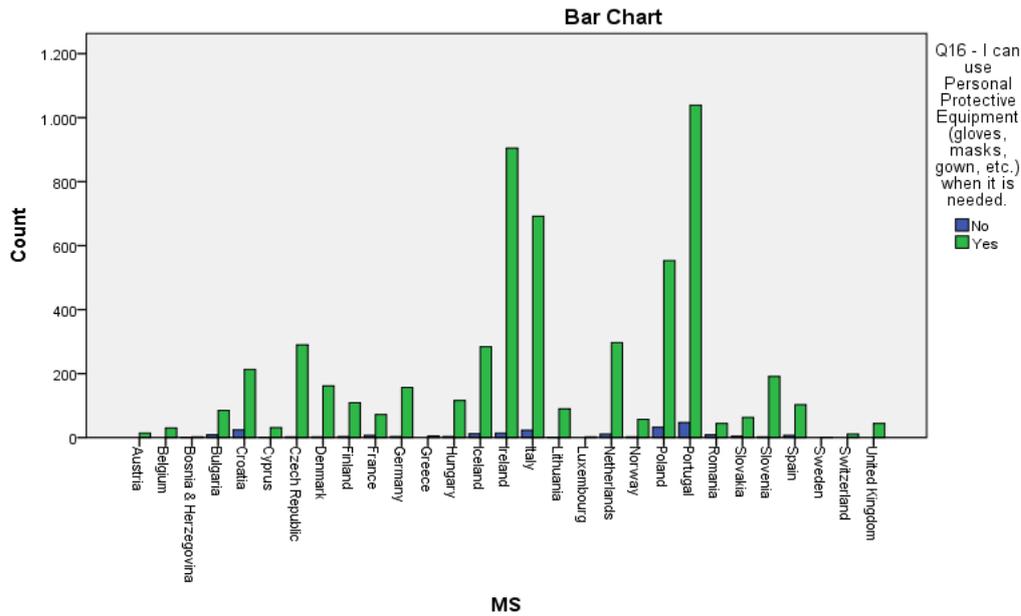
Furthermore, only 80% of respondents confirm they have appropriate sharp bins to discard needles and sharp instruments.

Q.15 There are appropriate sharp bins to discard needles and sharp instruments.				
		Frequency	Valid Percent	Cumulative Percent
Valid	1. Strongly disagree	170	2,9	2,9
	2. Disagree	182	3,1	6,0
	3. Agree	2107	35,8	41,8
	4. Strongly agree	3419	58,2	100,0
Total		5878	100,0	
Missing	System	1093		
Total		6971		

In line with the previous positive response, 96% of respondents confirmed they have personal protective equipment when they need.

Q.16 I can use Personal Protective Equipment when it is needed.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	219	3,1	3,7	3,7
	Yes	5662	81,2	96,3	100,0
	Total	5881	84,4	100,0	
Missing	System	1090	15,6		
Total		6971	100,0		

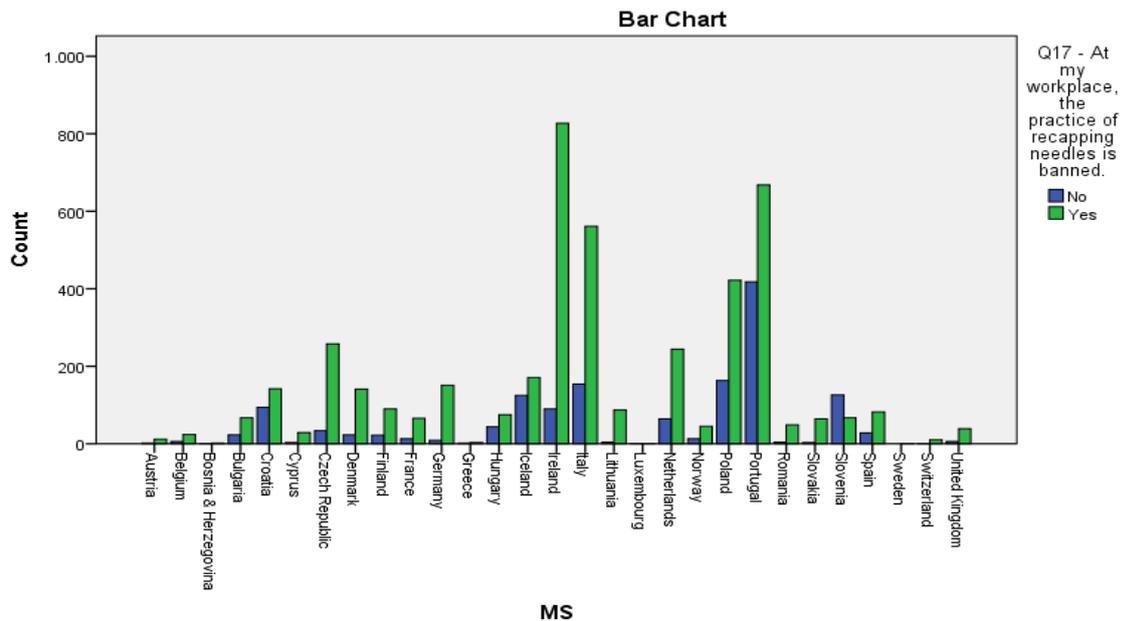
As evidenced in the table below shows the distribution per countries from all which the majority of respondents have confirmed that appropriate discard bins and PPE (personal protective equipment), including gloves, masks and gowns, is available when needed. Still, although results are very positive, the availability of necessary Personal Protective Equipment shall reach 100%, as no health professionals should see her/his risk of exposure to sharp injuries increased due to a lack of protection.



However, although Directive 2010/32/EU prohibited the practice of recapping with immediate effect, there are still 25% of respondents that affirm it is NOT YET prohibited at their workplace.

Q.17 At my workplace, the practice of recapping needles is banned.		
	Frequency	Valid Percent
No	1476	25,1
Valid Yes	4398	74,9
Total	5874	100,0
Missing System	1097	
Total	6971	

Looking at the distribution per countries, only from Slovenia more respondents answer that the practice of recapping was not banned at their workplace. Those countries were a vast majority of respondents replied positively to the question are Czech Republic, Denmark, Germany, Ireland, Italy, Netherlands, Poland and Portugal. Notwithstanding these are positive results, there is still work to do in order to achieve the 100% banned recapping requested at EU level.



To conclude the interpretation of the questions related to Directive Clause 6, elimination, prevention and protection, the overall question “I believe that in my workplace appropriate measure to prevent sharp injuries have been implemented”, 74% of respondents believe that appropriate measures to prevent sharp injuries have been implemented at their workplace in contrast to 27% representing 1512 respondents. Interestingly, a total of 1278 respondents did not give an answer to this question. Here, there are potential links to the negative responses related to information specific to sharp injuries, and awareness (Clause 7) and specific training on policies and procedures related to sharps injuries (Clause 8). Without appropriate information, healthcare workers may well not be in a position to assess whether appropriate preventative measures are in place or not.

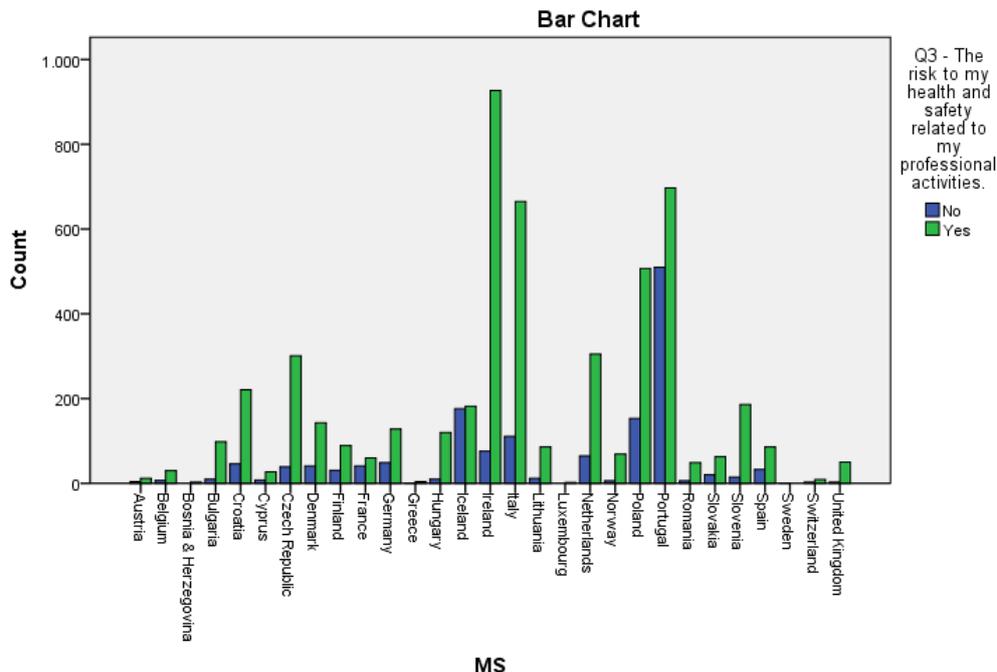
Q.24 I believe that in my workplace, appropriate measures to prevent sharp injuries have been implemented.				
	Frequency	Valid Percent	Cumulative Percent	
Valid	1. Strongly disagree	303	5,3	5,3
	2. Disagree	1209	21,2	26,6
	3. Agree	3261	57,3	83,8
	4. Strongly agree	920	16,2	100,0
	Total	5693	100,0	
Missing	System	1278		
Total		6971		

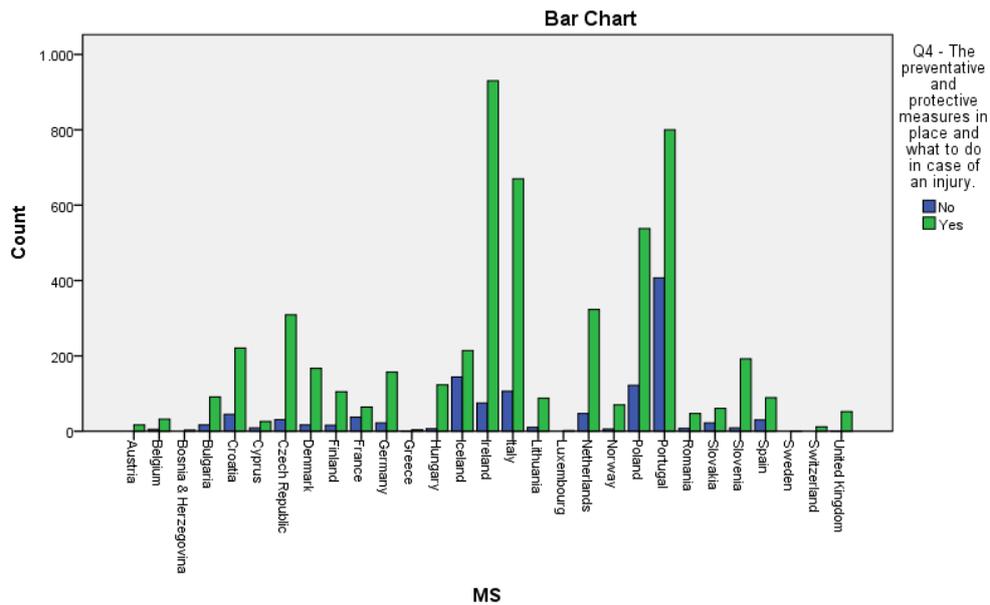
Directive Clause 7 - Information and Awareness-raising

The Directive outlines that employers shall take the following appropriate measures to raise awareness amongst workers and their managers: highlight the risks of handling sharps; give guidance on existing legislation and local policies; promote good practices and safe systems of work regarding the prevention of sharps injuries; promote the importance of recording sharps injuries; raise awareness by developing activities and promotional materials in partnership with representative trade unions and/or workers' representatives; and provide information on support programmes available.

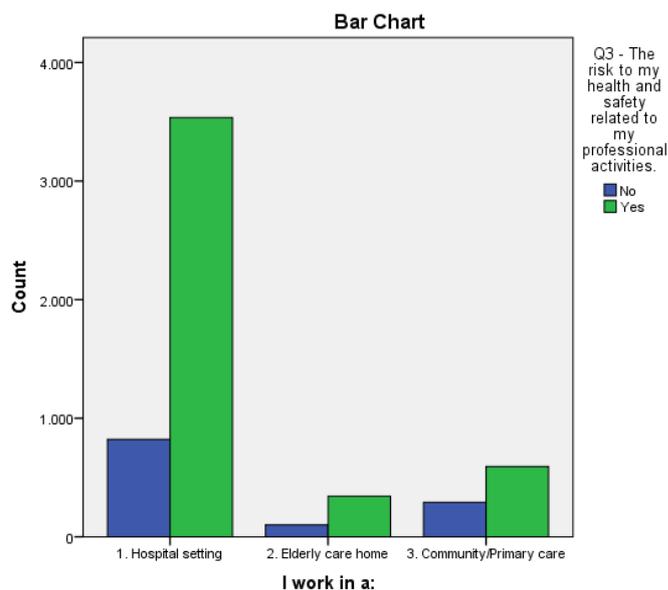
Very positively, the 78% of respondents declare that their employer has provided them with basic information concerning the risk to health and safety related to their professional activities (Question 3). On the available preventive and protective measures, most respondents (82%) confirmed having received such information (Question 4).

According to the distribution per countries, Croatia, Czech Republic, Hungary, Ireland, Italy, Netherlands and Slovenia are the countries where a major percentage of respondents confirmed to have received basic information by their employer on the risk related to the professional activities and on the preventive and protective measures to take in case of an injury.





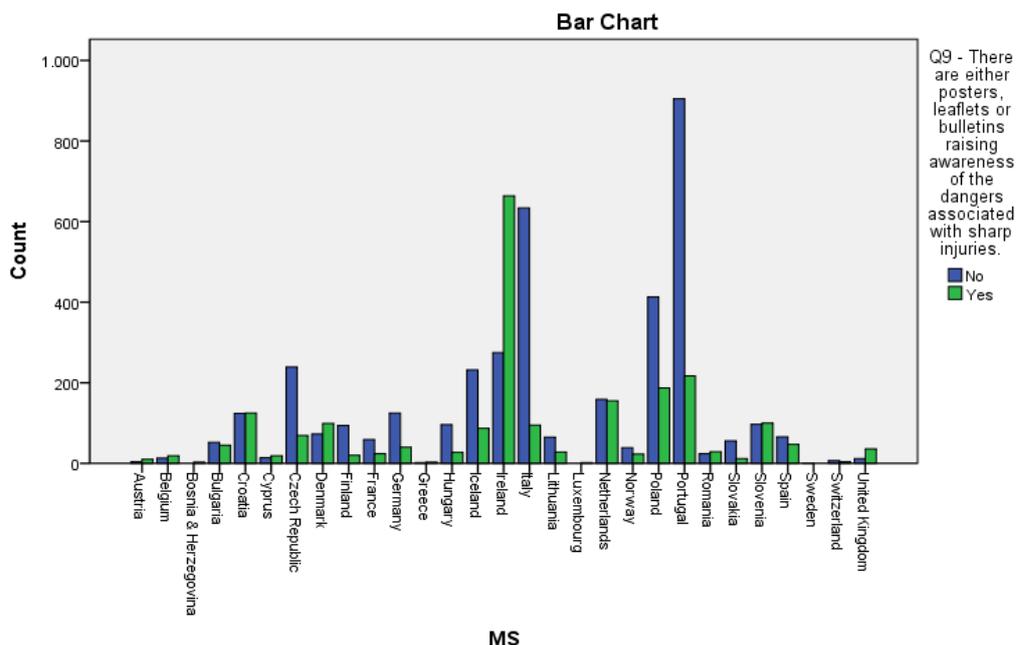
When analysing the information received by the employers and the place where the professional works, it is worth mentioning to see that in every sector – hospital, community, elderly care settings – a majority of respondents have received appropriate information at work about the risks and protective measures related to the prevention of sharp injuries, with a more positive inclination in hospital settings.



As regards the availability of information publicly displayed in healthcare settings, a major percentage of respondents (64%) answered they are NOT available at their workplace. Acknowledging the existence of agencies (EU-OSHA) which main mission is to provide awareness of the safety at work, more efforts are needed to ensure that all workplaces have information on sharp injuries. Awareness campaigns are needed to inform professionals and patients of the dangers associated with sharp injuries, ensuring the dissemination of information on the importance of worker's health and safety for European social and economic stability and growth.

Q.9 There are either posters, leaflets or bulletins raising awareness of the dangers associated with sharp injuries.			
		Frequency	Valid Percent
Valid	No	3880	63,9
	Yes	2189	36,1
	Total	6069	100,0
Missing	System	902	
Total		6971	

Looking at the countries distribution, the country where more information is available raising awareness on the dangers of sharps injuries, is Ireland.



On a different note, Directive 2010/32/EU promotes that employers and health professionals' representatives work together at the appropriate level to prevent risks, protect workers' health and safety, and create a safe working environment, including consultation on the choice and use of safe equipment, identifying how best to carry out training, information and awareness campaigns. A total of 58% of respondents confirmed that nurses were NOT involved in the selection of suitable needed protective devices. Being using these devices every day in clinical practice, it is necessary that nurses become more engaged, having a say, in the selection of the devices in order to select the most appropriate ones for their daily practice. As with any product, the level of quality and performance varies by manufacturer.

Q.13 Nurses were involved in the selection of suitable needle protection safety devices.

	Frequency	Valid Percent	Cumulative Percent
Valid 1. Strongly disagree	1410	24,1	24,1
2. Disagree	1998	34,1	58,2
3. Agree	1987	34,0	92,2
4. Strongly agree	456	7,8	100,0
Total	5851	100,0	
Missing System	1120		
Total	6971		

Directive Clause 8 - Education and Training

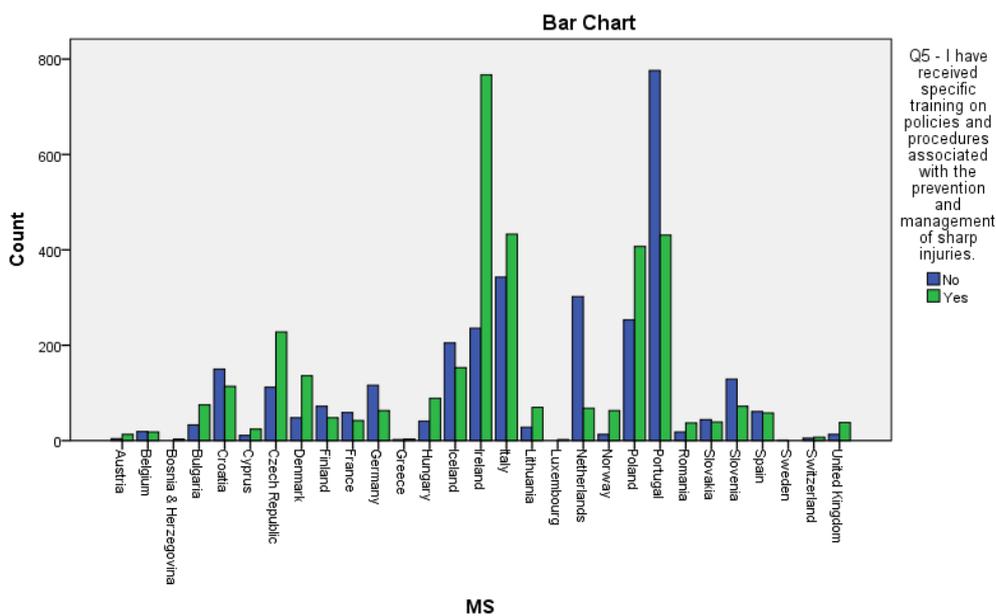
According to Directive 2010/32/EU, appropriate training shall be made available on policies and procedures associated with sharps injuries. Healthcare professionals shall be trained about risk assessment and controls and the proper procedure for using the medical devices and disposal equipment. Health professionals shall receive training on policies and procedures associated with the prevention and management of sharps injuries during induction for all new and temporary staff and at regular intervals thereafter. This training shall include: the correct use of medical devices incorporating sharps protection mechanisms; induction for all new and temporary staff; risk associated with blood and body fluid exposures; preventative measures including standard precautions, safe systems of work (including the ban on recapping) and, the correct use of sharps bins and disposal procedures; the importance of immunisation and how to access immunisation services; and reporting, response and monitoring procedures and their importance.

However, despite that explicit legislative requirement at EU level, according to the respondents, only 53% of them have received specific education and training on policies and procedures associated with sharp injuries.

Q.5 I have received specific training on policies and procedures associated with sharp injuries.

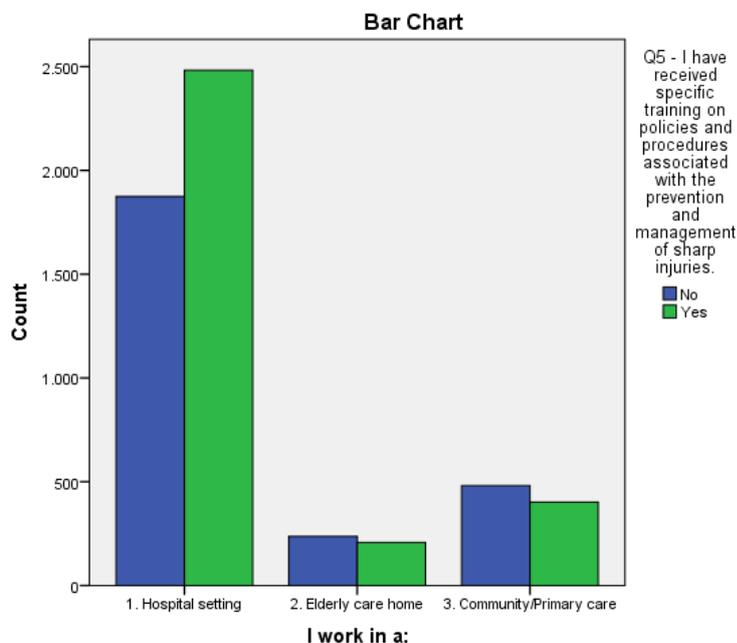
	Frequency	Valid Percent
No	3094	46,9
Yes	3501	53,1
Total	6595	100,0
Missing System	376	
Total	6971	

Looking at the distribution per countries, those countries with a major proportion of respondents declaring NOT having received specific education and training on sharp injuries are Iceland, Netherlands, Portugal and Slovenia. On the other hand, those ones with a higher proportion of respondents replying positively are Czech Republic, Ireland and Poland.



More importantly, when analysing the education received in relation to the place where respondents work, more than half of respondents working in community care (55%) and elderly homes (53%) have NOT received specific education on sharps injuries. Even though

in hospital settings, a majority of respondents have received education, there is still 43% who have not received specific education and training on sharp injuries, which deserve special attention.



Among those respondents having received specific education, there is a good distribution among the different topics that must be covered according to Directive 2010/32/EU. However, more attention is placed on “preventive measures” and less to “the importance of immunization and how to access it”. These topics mentioned in the table below are the minimum components that the specific education on sharps injuries for health professionals should include, therefore, although the distribution is positive, more efforts should be done in ensuring all topics are equally included and addressed.

Q.6 The areas where education is provided		
1. The risk associated with blood and body fluid exposures	2767	79,03 (3)
2. Preventive measures such as standard precautions	3059	87,37 (1)
3. The correct use of medical devices that use a sharps prot	2499	71,37 (5)
4. Measures to be taken in case of injuries	2886	82,43 (2)
5. The importance of immunization and how to access immuniza	2217	63,32 (6)
6. The reporting and follow up procedures	2573	73,49 (4)
Total	6971	

Furthermore, when analysing the education and training component of the Directive, thirty percent (30%) of respondents feel they need more instructions on the measures to be taken in the event of an injury. This result clashes with the results from question 3 and 4, where 78% and 82%, respectively, replied their employer provided them with basic information on the risks and preventive measures. These contrasting figures suggest that the information provided by the employers do not seem to be ‘fit for practice’, making health professionals, in particular nurses, adequately prepared in the event of an injury or in a position to reasonably assess the adequacy of protective measures provided.

Q.12 At my workplace, I have been provided with sufficient instructions on measures to be taken in the event of an injury.			
	Frequency	Valid Percent	Cumulative %
	1. Strongly disagree	581	9,6
	2. Disagree	1221	20,1
Valid	3. Agree	3166	52,2
	4. Strongly agree	1100	18,1
	Total	6068	100,0
Missing	System	903	
Total		6971	

Interestingly, 76% of respondents indicate that suppliers of needle protection devices DO NOT provide regular training on the use of needle protection devices. It seems that some manufactures are not putting much attention to provide adequate training to use their devices in the most suitable way. Managers of healthcare settings should therefore increase the requirement in public procurements for the commitment in providing the necessary training to use their devices in the most appropriate way. It should be considered the overall offering when making procurement decisions so that cost alone does not dominate the decision process.

Q.14 The suppliers of the needle protection safety devices provide regular training on their use.			
	Frequency	Valid Percent	Cumulative%
	1. Strongly disagree	2090	35,7
	2. Disagree	2336	39,9
Valid	3. Agree	1236	21,1
	4. Strongly agree	198	3,4
	Total	5860	100,0

Missing	System	1111	
Total		6971	

Directive Clause 9 - Reporting

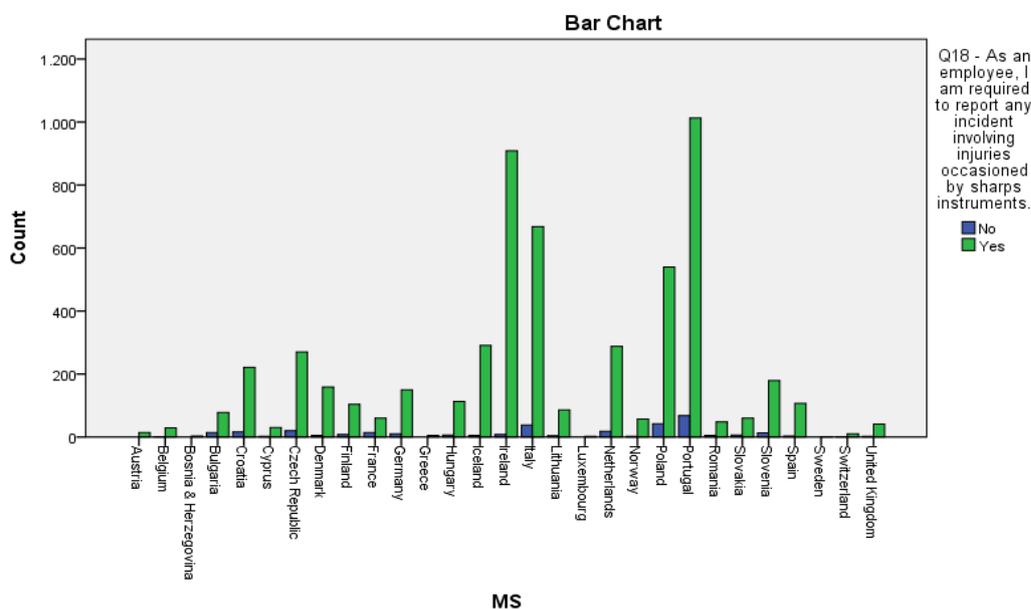
Health professionals shall immediately report any accident or incident involving sharps to the employers and/or to the person responsible for safety and health at work. This implies that in all EU member states there is a reporting system available.

According to the results, the majority of professionals (95%) feel the responsibility of reporting any incident involving injuries with sharps instruments. This should entail that reporting systems are well established in the daily practice and professionals are aware of their responsibility to report these incidents.

Q.18 As an employee, I am required to report any incident involving injuries occasioned by sharps instruments.

		Frequency	Valid Percent
Valid	No	311	5,3
	Yes	5536	94,7
Total		5847	100,0
Missing	System	1124	
Total		6971	

This impressive result is homogenous among all the countries included in this report.



Within the designed reporting systems all over the EU, 73% of the respondents feel THERE IS a no-blame culture in relation to reporting injuries at their workplace. This fact contributes to enhance the reporting and promotes a safer culture at the workplace.

Q.19 At my workplace, there is a no-blame culture in relation to reporting injuries by sharp instruments.			
	Frequency	Valid Percent	Cumulative Percent
	1. Strongly disagree	430	7,4
	2. Disagree	1155	19,8
Valid	3. Agree	2909	49,8
	4. Strongly agree	1347	23,1
	Total	5841	100,0
Missing	System	1130	
Total		6971	

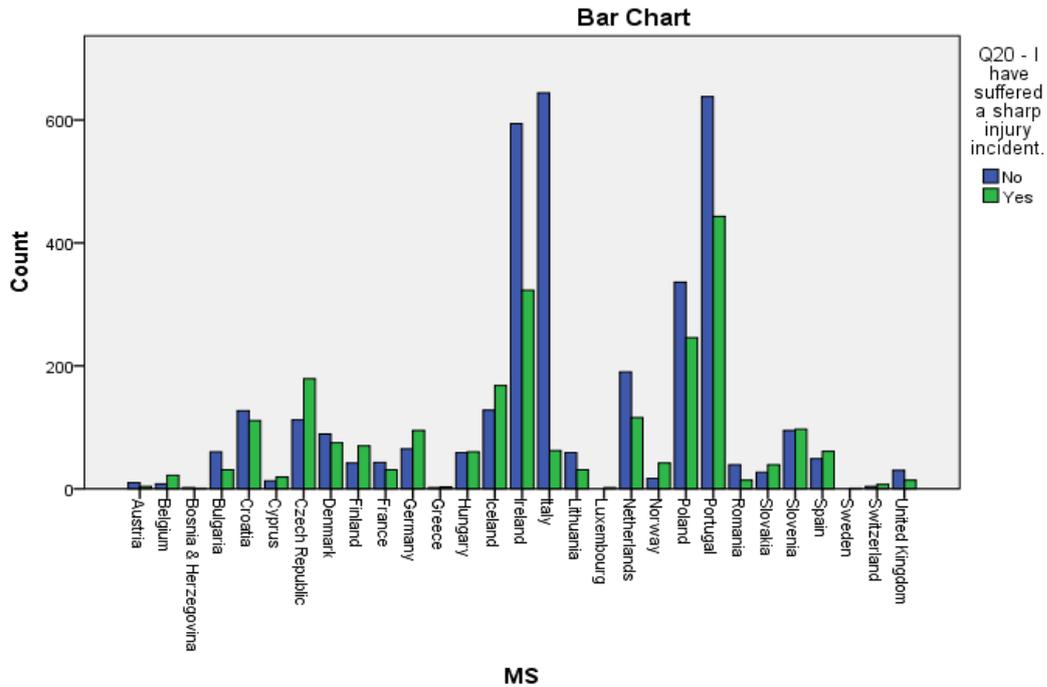
Directive Clause 10 - Response and Follow-up

The Directive outlines that policies and procedures shall be in place where a sharp injury occurs. All workers must be made aware of these policies and procedures.

In terms of respondents themselves having sustained an injury, despite some measures have been implemented, still 41% of the respondents have suffered an injury.

Q.20 I have suffered a sharp injury incident.		
	Frequency	Valid Percent
	No	3482
Valid	Yes	2367
	Total	5849
Missing	System	1122
Total		6971

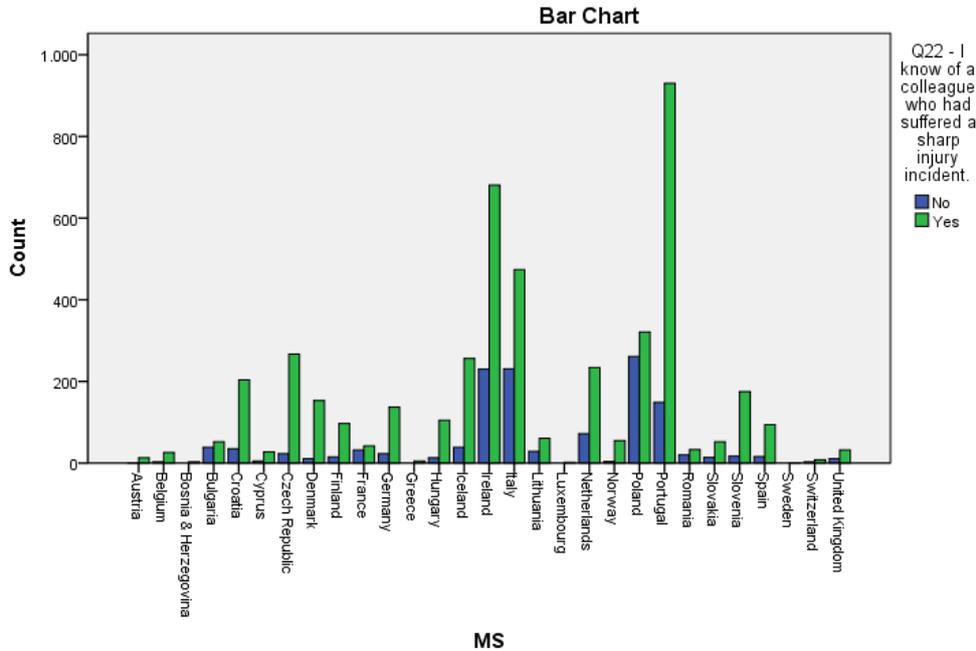
Looking at the data across countries, there are some countries from which more respondents have suffered an incident, such as Belgium, Czech Republic, Finland, Germany, Iceland and Spain.



In the same line, but directing the question to whether the professional knows a colleague that has suffered a sharp injury incident, the figure increases drastically to 78%. This again shows the importance of having a European Directive in place.

Q.22 I know of a colleague who had suffered a sharp injury incident.		
	Frequency	Valid Percent
Valid	No	22,2
Valid	Yes	77,8
	Total	100,0
Missing	System	
Total	6971	

Furthermore, all countries have respondents confirming they know of a colleague who has suffered a sharp injury incident. The added value of having a European Directive is that it concerns all EU member states.



From those respondents confirming they had suffered an incident related to sharp injuries, 60% report that immediate action has been taken and 51% report that the incident was registered in a database.

When analysing more in detail whether the employer investigated the causes of the incident, only 27% reported positively. Unfortunately, 63% of those having an incident felt they were not provided with support. The fact that 63% felt not having support is problematic, as it is well-known that anxiety not addressed in a timely manner can have serious psychological consequences, impacting on sick-leave figures. The risk of contracting a serious illness means that the victims of sharps injuries feel strong concerns. Such concerns naturally have serious implications for their well-being, and may affect their mental health status. Such anxiety certainly concerns one's own health, but there are equally fears of having transmitted a disease to a relative or of doing so in the future. A sharps injury can thus affect the health condition even if one is not infected.

Taking into account both question 21 and 23, both perspectives tend to agree, regardless whether the sharp injury incident had occurred to the professional itself or to a colleague. Actions related to immediate action and reporting of the event are higher rated than actions related to identification of the cause and the provision of support.

Q.21 If YES (ME): (multiple answers were possible)

	Frequency	Valid Percent
1. Immediate action was taken for my care including the prov	1423	60,11 (1)
2. The incident was registered in a database.	1204	50,86 (2)
3. The employer investigated the causes and circumstances.	648	27,37 (4)
4. I was provided with support.	878	37,09 (3)
Total	6971	

Q.23 If YES (Colleague): (multiple answers were possible):

	Frequency	Valid Percent
1. The employer took immediate action for the care my collea	3152	69,4 (1)
2. The incident was registered in a database.	2281	50,24 (2)
3. The employer investigated the causes and circumstances.	1577	34,73 (4)
4. My colleague was provided with support.	2022	44,54 (3)
On Total of	6971	

Comparison Q21 & Q23

	ME	Colleague
The employer took immediate action for the care me/my colleague	60,11	69,4
The incident was registered in a database.	50,86	50,24
The employer investigated the causes and circumstances.	27,37	34,73
I/My colleague were/was provided with support.	37,09	44,54

Directive Clause 11 - Implementation

This survey suggests that positive actions are being taken in most Member States, but implementation is at this stage limited and there is still much to be done. The role of national enforcement agencies will be critical in ensuring full compliance.

Results Explorative Cluster Analysis

In addition to the descriptive data analysis leading to the interpretation of frequencies for each variable, and even cross table combinations, a hierarchical cluster analysis visualises the views and experiences from respondents in such a way that variables can be combined according to the response trends.

The cluster analysis is based on the assignment of a set of observations into different subsets (clusters) aligning data based on similarities or differences. The basic criterion for clustering is distance in opinion, in views, in experience as expressed in the statements rated on a Likert scale from 'strongly disagree' (1) to 'strongly agree' (4). Nevertheless, nominal data (yes and no) can be used to cluster variables.

Hierarchical cluster analysis begins by separating each case into a cluster by itself. At each stage of the analysis the criterion by which cases are separated is relaxed in order to link the two most similar clusters until all of the objects are joined in a complete classification tree. The dendrogram is used to visualise the steps in a hierarchical clustering solution; this shows the clusters being combined and the values of the distance coefficients as each step merges. Connected vertical lines designate joined cases.

Views from respondents that are near each other should belong to the same cluster, and views that are far from each other should belong to different clusters. Through cluster analysis patterns can be identified which can lead to a higher level of interpretation, compared to frequency tables and cross tables with a descriptive analysis. This is particularly interesting as the Directive 2010/32/EU composes of specific articles (clauses):

- Clause 5 on Risk Assessment (linked to questions 10 and 11).
- Clause 6 on Elimination, prevention and protection (linked to questions 7, 8, 15, 16, 17 and 24).

- Clause Art 7 on Information and awareness-raising (linked to questions 3, 4 and 9).
- Clause Art 8 on Education and training (linked to questions 5, 6, and 12).
- Clause Art 9 and 10 on Reporting, Response and follow up (linked to questions 18, 19, 20, and 21).

From the dendrogram below, the questions cluster clearly into two blocs implying that the patterns of responses are different. Cluster one has many sub-clusters which can be analysed while cluster 2 groups four main questions: Q12-Q24-Q19-Q15

Q12 - At my workplace, I have been provided with sufficient instructions on measures to be taken in the event of an injury

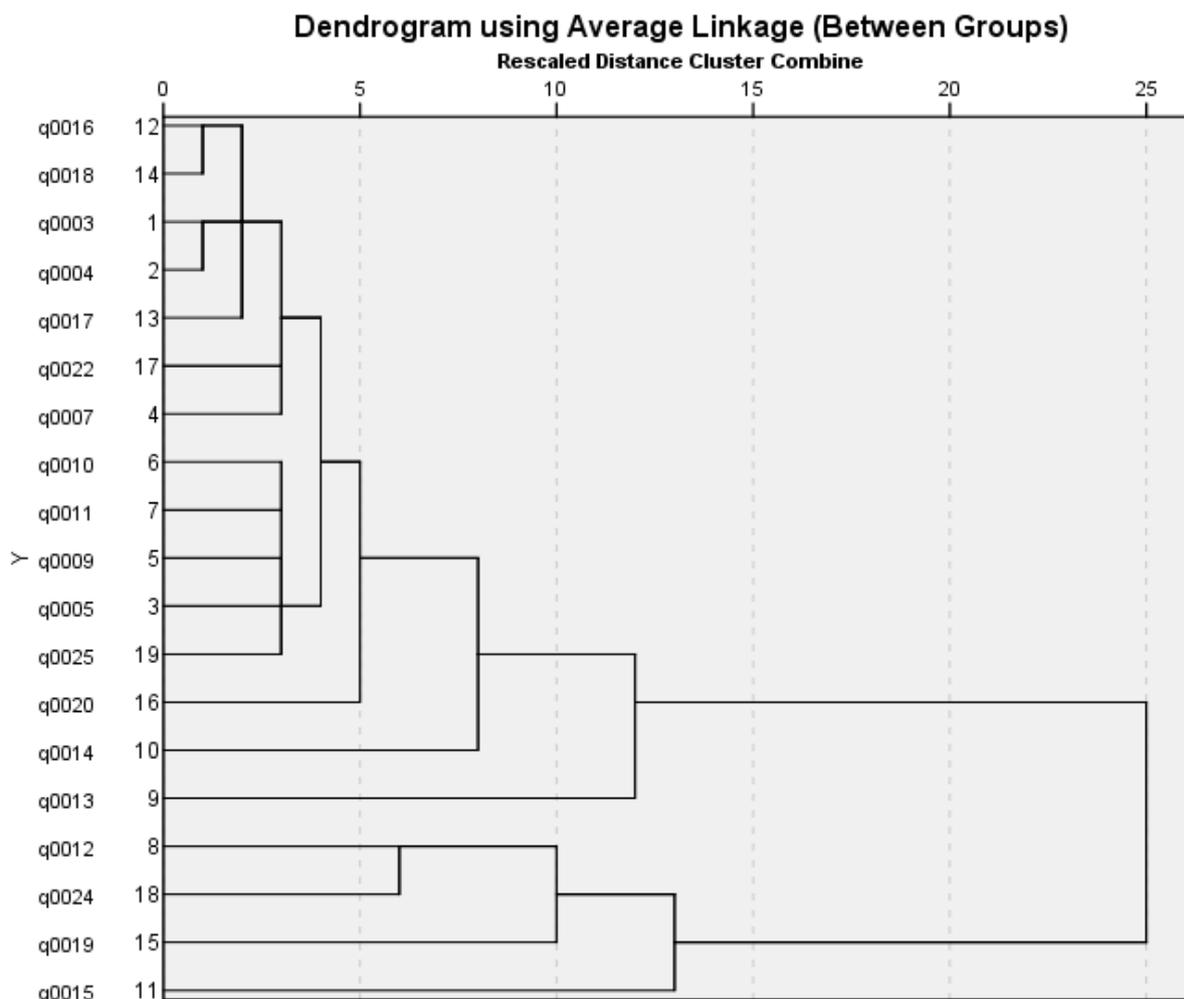
Q24 - I believe that in my workplace, appropriate measures to prevent sharp injuries have been implemented

Q19 - At my workplace, there is a no-blame culture in relation to reporting injuries by sharp instruments.

Q15 - There are appropriate sharp bins to discard needles and sharp instruments

This “independent cluster” indicates the strong link between “getting clear instructions”, “concrete measures taken”, “having a no blame culture” and having at the disposal “appropriate sharp bins”. These strong respondents views on these 4 topics implies that when health professionals, in particular nurses, have received information on the prevention of sharp injuries, they tend to respond more positively to the question on whether or not appropriate measures have been implemented at the workplace. Providing information, involving nurses in the selection and training of devices makes them empowered on creating a positive working environment free from sharps injuries. Automatically, a no-blame culture tends to join those who have received information and those who rate the measures taken at their workplace better. Based on these findings, an important equation can be suggested:

Successful implementation Directive 2010/32/EU = (Elimination, prevention and protection)
+ (Education and training) + (Reporting, Response and follow-up).



In contrast to the ‘independent cluster 12-24-19-15’ a second cluster groups questions, themes, from three more “independence” domains of concern of which the patterns of respondents answers have no ambition to join other clusters. We are mainly referring to:

- Q20 - I have suffered a sharps injury incident.
- Q14 - The suppliers of the needle protection safety devices provide regular training on use.
- Q13 - Nurses were involved in the selection of suitable needle protection safety devices.

Within this second cluster, one theme (Q13 - Nurses were involved in the selection of suitable needle protection safety devices) stays isolated, indicating nurses are NOT involved in deciding which material they are using in the clinical practice. Also the theme Industry (Q14 - The suppliers of the needle protection safety devices provide regular training on their use) is perceived as negative in creating a safer working environment. Both “selection” and “suppliers” relate to the public procurement process where nurses need to decide on which

material the hospital needs to buy avoiding thus decision being driven by price alone and the industry providing the needed education to use the material appropriately.

There is a relation between the professionals having preventive measures at their disposal and the reporting systems on sharps injuries incidents. Those respondents that have PPE (Personal, Protective Equipment) and medical devices that incorporate a safety mechanism at their disposal relate to those ones responding they report incidents. Also closely related are the respondents that report that they have been provided with basic information on risks and preventive measures by their employer and those ones responding that the practice of recapping is banned at their workplace. The meaning of cluster 1 relates very strongly to the reporting system and the availability of preventive measures in place.

Q16 - I can use Personal Protective Equipment when it is needed.

Q18 - As an employee, I am required to report any incident involving injuries occasioned by sharps instruments.

Q3 - The risk to my health and safety related to my professional activities.

Q4 - The preventative and protective measures in place and what to do in case of an injury.

Q17 - At my workplace, the practice of recapping needles is banned.

Q22 - I know of a colleague who had suffered a sharp injury incident.

Q7 - My workplace has at my disposal medical devices that incorporate a safety mechanism.

More questions and respondents cluster from a very interesting aspect, namely Q10, Q11, Q9, Q5 and Q25. The fact that professionals have been provided with specific education relates to the performance of risk assessments in the workplace and the availability of specific trained staff on sharp injuries that nurses in the workplace can consult. The cluster adds a new relation with the information and awareness raising and more positive perception of professionals that their practice has improved since the Directive was transposed. In other words, health professionals, mainly nurses feel their professional practice improved when their employer carries out risk assessments, having the opportunity to consult in the unit a colleague that have received specific education on the prevention of sharps injuries.

Q10 - My employer carries out **risk assessments** of sharps injuries in the workplace.

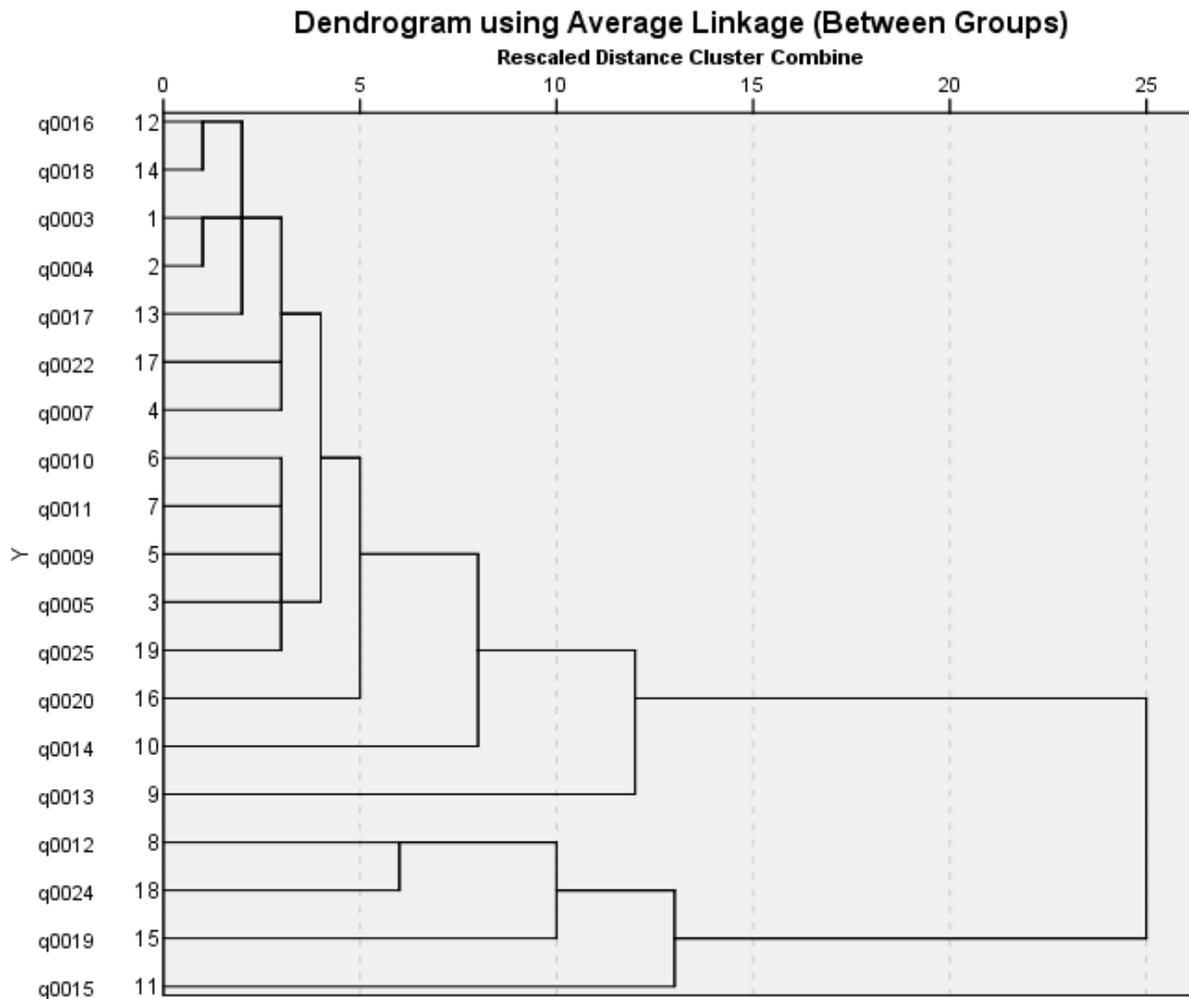
Q11 - At my workplace, there is a member of **staff/unit trained in risk assessment** and management of sharp injuries that I can consult.

Q9 - There are either **posters, leaflets or bulletins raising awareness** of the dangers

associated with sharp injuries.

Q5 - I have received **specific training on policies and procedures** associated with the prevention and management of sharp injuries.

Q25 - Has your practice improved since the Sharps Directive 32 was transposed into your national legislation?



Most sub-clusters joined after 5 iterations, meaning that there is a first level of action, where basic information, reporting, banning and availability of safety devices goes hand in hand, and a second, more in depth, level of action which includes specific education, the performance of risk assessments and specific expertise available at the unit. When this second level of action is achieved, professionals tend to perceive their practice is improved.

Conclusions

There are 21 million workers active in the hospital and healthcare sector in Europe². It is estimated that 1 million needle stick injuries occur annually³, while from our data of 6971 professionals, mainly nurses, 41% reported to have suffered a sharp injury incident. This is extremely high!, and provides a serious disincentive for a career in nursing.

A very high percentage of respondents, 74%, indicate that appropriate measures to prevent sharp injuries have been implemented at their workplace although just on certain procedures, as blood collection and catheterisation, and 53% of the respondents indicate that their professional practice has improved since Directive 2010/32/EU was transposed into their national legislation. Findings equally indicate there is some availability of safety equipment and discard bins. 70% of respondents have at their disposal devices that incorporate safety mechanism especially for blood collection, injection and IV catheterization. It is important to note that cohabitation of safety engineered devices and conventional devices can potentially cause additional risks. On discard bins, 80% of respondents confirm to have appropriate ones. Very positively 96% of respondents confirmed they have personal protective equipment. As regards reporting, the majority of professionals (95%) recognise the responsibility of reporting any incident involving injuries in which sharps instruments were involved. Interesting, 73% of respondents feel there is a no-blame culture in relation to reporting injuries at their workplace. This fact contributes to enhance the reporting and promotes a safer culture at the workplace.

Nevertheless, the fact that there are still a high number of sharps injuries incidents and responses combined with other domain questions of the Directive 2010/32/EU reveal that there are still significant aspects within the different Directive 2010/32/EU articles the profession and stakeholders needs to look at to reach a “zero tolerance level”.

Professionals tend to think that discard bins, safe devices and protective equipment are the only measures that have to be implemented and they are less aware of the importance of risk analysis and management, education and training, next to the engagement of nurses in the selection of devices for their daily clinical practice. From the findings it becomes clear that some necessary measures, such a stopping recapping, have not yet been widely implemented,

² Eurofound report “Employment and industrial relations in the healthcare sector, February 2011. Accessed at:

³ OSHA

which could explain why there is still such a high rate of professionals saying they have suffered a sharp injury incident. National legislation have had an impact in most cases.

Evidence shows that the majority of sharp injuries incidents can be avoided using a combination of education and training, safer working practices, risk assessment and medical technology that incorporates safety features. This mixed approach is indeed reflected in Directive 2010/32/EU on prevention from sharp injuries in the hospital and healthcare sector, resulting from the Framework Agreement by HOSPEEM and EPSU. Studies have demonstrated that failure to implement any one of these three elements results in a significantly reduced impact. Indeed, this mixed approach is lacking when analysing the 6971 answers from respondents where only half of respondents, 53% have received specific training on policies and procedures on the prevention and management of sharp injuries.

Although 78% and 82% of respondents declare that their employer has provided them with basic information concerning the risk to health and safety and preventive and protective measures related to their professional activities, specific education has not been widely provided. A well trained nursing workforce is essential to prevent the risk of injuries and infections from sharps, as stated in Directive 2010/32/EU, the fact that half of respondents confirmed they have not received specific training means that more focussed actions have to be undertaken to counter these weaknesses.

Furthermore, the percentage of professionals not receiving specific education on sharp injuries increases when the professionals are working in community care or elderly homes. Still, findings suggest there is a tendency to invest more in preventive measures in hospital settings rather than in other sectors. Taking into account the well-known societal challenges, elderly care and community/primary care need to get way much more attention, especially when moving towards an integrated care system within the EU.

In order to reverse this lack of specific training, Member States should make use of the approved European Social Funds for the period 2014-2020, with the objective of strengthening the capacity of the health workforce. Areas for this specific training must cover:

- a. Risk assessments;
- b. Implementing preventive measures;

- c. Urgently banning recapping;
- d. Concrete measures to take in case of an injury;
- e. Reporting within a no-blame culture;
- f. Selection of appropriate safety engineered devices; and,
- g. Appropriate training in the use of safety engineered devices.

Part of the mixed approach for the prevention of sharp injuries is performing risk assessment activities at the workplace. Employers are required to undertake regular risk assessment of all situations where there is injury, blood or other potentially infectious material. Risk assessments shall take into account technology, organisation of work, working conditions, level of qualifications, work related psycho-social factors and the influence of factors related to the working environment. This will identify how exposure could be eliminated and consider possible alternative systems. The results of the risk assessment should be shared with all employees at risk in the workplace. Based on the findings, less than half of respondents, 41%, report that their employer carries out risk assessments of sharps injuries in the workplace. Being a compulsory requirement of Directive 2010/32/EU, more actions are needed to engage nurses, the health workforce, with the risk assessments. Based on the risk assessment reports all risks should be eliminated by the consistent introduction of safety devices, sharps bins and safe procedures for using and disposing of sharp medical instruments and contaminated waste. It is therefore very important that professionals are engaged in risk assessments which cannot be a theoretical exercise performed by managers or directors. Professionals working in the field, at the bedside, must be involved in these assessments and the role of the Unions is within this context crucially important. A first step to improve the situation is the development of a reference colleague, a Link Nurse, being located within the team of nurses, health professionals and workers, being flexible consulted and taking up a more prominent role in the prevention of sharp injuries at the workplace.

The EU Structural and Cohesion Funds are available to address the challenges of the economic crisis, the development of an EU workforce for health and skill development, employment and growth. The proposals to be submitted can develop separate work packages using the key articles of the EU Directive 2010/32/EU on prevention from sharps injuries in the hospital and healthcare sector. A good example is the urgent need for a wider availability of safety equipment reaching 100% coverage, as no health professionals should see her/his

risk of exposure to sharp injuries increased due to a lack of protective material. Furthermore, an environment where nurses have the provision of safety engineered devices for certain procedures where sharps are employed and not others, is inequitable and a source of additional risk.

Furthermore, there are urgent actions to be taken on the interdiction of recapping needles. Still 25% of respondents declare that recapping is not banned at their workplace despite Directive 2010/32/EU prohibited the practice of recapping with immediate effect. Recapping needles is a common cause of sharp injuries. Although re-capping of needles has been banned in the EU, there is still an urgent need to increase the awareness in practice, among employers and employees, that needles should never be recapped.

Another important aspect of the availability of equipment is to include the nurses' voice when choosing safe equipment for their daily working environment. It is worrying that almost 60% of respondents confirmed that nurses were not involved in the selection of suitable needed protective devices. Up scaling nurses' skills and competencies in public procurements, becoming familiarised and engaged in the selection of devices in order to select the most appropriate for the daily practice is key for reducing sharp injuries. Engagement goes way beyond employers and managers consulting workers' representatives on the choice and using safety devices, identifying 'fit for practice' training, next to what information is needed to create safe working environments and using awareness-raising campaigns to make a change possible.

It is therefore worrying that a major percentage of respondents (64%) perceive the availability of information publicly displayed in healthcare settings as insufficient, knowing that the EU-OSHA agency main mission is to provide awareness of the safety at work. Therefore, more efforts are needed to ensure that all workplaces have information on the prevention of sharp injuries, on safety measures to prevent sharp injuries. Awareness campaigns are needed to inform health professionals, at the workplace, of the dangers associated with sharp injuries, ensuring the dissemination of information on the importance of worker's health and safety for European social and economic stability and growth. It is also within this context that the industry participates more actively in the prevention of sharps injuries not only by putting safety devices on the market but really engaging nurses in the design process but additionally by providing users the training to effectively use the safety

devices. Last but not least, when exploring the experiences of health professionals who had suffered a sharp injury incident, more action is needed from the employer side to investigate the causes of the incident and to provide adequate support to the individual suffering from a sharp injury. Although more positively, in a majority of cases immediate action was taken and the incident was registered, areas such as the support to the professional are key and cannot be disregarded. The risk of contracting a serious illness means that the victims of sharps injuries feel strong concerns. Such concerns have serious implications for the well-being of each healthcare professional and worker as the emotional distress and the impact that this has on both their personal and professional lives is very significant.

References

1. EPSU & HOSPEEM. Final Report on Promotion and Support of Implementation of Directive 2010/32/EU on the prevention of sharps injuries. 30 September 2013.
2. Swedish Municipal Workers' Union, Vision and the Swedish Association of Health Professionals. "A zero-tolerance vision for blood-borne infection caused by sharps in healthcare". December 2012.
3. Balogh Z. et al. The incidence of needlestick injuries among health workers in Hungary.